

NJDEP Strategic Watershed Monitoring Program

Many of the criteria used in ranking watersheds, as well as multi-media and other environmental criteria and objectives developed through the watershed management process, rely on water quality data generated by the state's ambient surface water monitoring network, operated cooperatively by NJDEP and the US Geological Survey (USGS), New Jersey District. NJDEP and USGS have operated a cooperative, ambient surface water quality network for over twenty years. This network has provided a historic database for water quality assessment and the tracking of water quality trends over time. USGS also collects stream flow data through its stream-gauging network (see section 4.1.2). NJDEP is already using the ambient surface water-monitoring network to develop water quality data on a watershed basis. In 1997 a joint DEP/USGS Workgroup revised the ambient surface water-monitoring network to better serve the needs of the statewide watershed management framework. The strategic watershed-monitoring program is crucial to the success of the statewide watershed management framework. Specific features incorporated in the redesigned monitoring network, under this new program, include:

1. Randomly – located monitoring stations to provide generalized water quality data for statewide assessment.
2. Landuse indicator stations selected using GIS landuse data.
3. Alignment of ambient water quality and ambient biological monitoring networks.
4. Development of regional background/reference water quality stations.
5. Expansion of the network into tidally impacted areas.

The revised surface water-monitoring network provides WMA specific monitoring of New Jersey's surface waters. Fixed stations are located in subwatersheds (landuse indicator stations) and near the downstream boundary of each WMA (watershed integrator stations). Water quality data collected from the landuse indicator stations provides information on water quality associated with the dominant landuses in the WMA. Water quality data collected at the watershed integrator stations represent the overall impact of pollution sources (point and non-point) within the WMA. A final type of fixed station (reference/background) measures water quality at six "undisturbed" locations statewide. These locations represent New Jersey's major physiographic provinces. Water quality data is collected from network stations seasonally. The network provides the baseline data for trend analysis and establishes relationships between water quality and watershed characteristics (including landuse).

The AMNET program has established a network of lotic (running water) stations in every watershed in the state (i.e., 815 stations statewide). Under the current AMNET program, each watershed will be monitored for benthic macroinvertebrate populations on a five-year rotation schedule. At least one monitoring station is located on every second-order stream and all first-order streams at least three miles in length (First-order streams are those with no tributaries; second-order streams are those that have only first-order streams as tributaries). Furthermore, the network was designed with mainstem (second or third-order) stations located before the confluence of major tributaries and with stations located so as to assess the impacts of larger lakes. Known sources of contamination, and significant natural features (e.g. freshwater wetlands, preserves, Fish and Game Management Areas, etc.) are also considered when selecting sampling locations. All stations are positioned via Global Positioning

System (GPS) units, and are mapped using NJDEP's Geographic Information System (GIS) capabilities.

The combination of a fixed monitoring network with an intensive monitoring network, including both ground water and biological monitoring capabilities will significantly expand and enhance the state's water quality database, which is needed for implementation of the statewide watershed management framework. Monitoring on a watershed basis will also result in more efficient use of data and data collection resources by first collecting baseline information for watershed characterization and assessment, screening for issues of concern, and targeting more intensive data collection efforts for assessing issues, developing remediation strategies and evaluating strategy effectiveness.

Watershed-based monitoring should also result in increased reliability of data, through stakeholder collaboration and oversight of data collection and assessment methodologies, as well as provide opportunities for data and resource sharing; all of which should result in more thorough investigation and analysis of priority issues and solutions. This will provide a database for assessing "average" water quality in New Jersey. To expand the assessment potential of the ambient surface water network's database, it must also be integrated with other information sources such as biomonitoring data, NJPDES compliance data, rainfall data, GIS data coverages, and air deposition data.

Action Steps:

Accurate monitoring data are needed for several purposes, including establishing use support status, identifying positive or negative water quality trends, screening existing or emerging water quality problems, locating and quantifying pollutant sources, characterizing the extent of environmental contamination, evaluating the effectiveness of management actions, and calibrating models for use in defining and distributing a watershed's assimilative capacity (i.e., TMDL development). The strategic watershed monitoring program will coordinate data collection activities within and across NJDEP programs and with other monitoring efforts, such as discharger, purveyor and volunteer water monitoring activities, as well as air deposition monitoring, to meet watershed management objectives and to maximize efficient use of resources.

Ambient monitoring is being conducted, as described above, at strategically located sites for the purpose of assessing, documenting trends, screening problems, and evaluating the overall effectiveness of management controls. Intensive surveys will be integrated with watershed monitoring and modeling to identify adverse impacts from conventional and toxic pollutants or other stressors. Intensive surveys will be targeted as needed to locate and quantify pollutant sources, measure the effect and fate of pollutants, and characterize and assess watershed management areas. Biological monitoring will be employed as an indicator and screening tool to target areas where actual adverse water quality impacts or use impairments are evident. Chemical monitoring will be used to identify the location and relative amounts of specific contaminants in the water column so that inferences regarding the source(s) of the water quality impairments can be made. Targeted sediment sampling will be conducted as a screening tool to identify where more intensive monitoring for toxics may be necessary. Physical monitoring may also be used to

provide additional information about adverse impacts to the aquatic ecosystem (e.g. habitat loss, erosion) or use impairment.

The strategic monitoring program will help NJDEP and stakeholders develop the water quality, flow and other data needed to identify priority water quality and quantity issues. The strategic watershed monitoring program will also provide data to support watershed modeling efforts that will facilitate development of watershed goals (e.g. TMDLs) and management strategies to be implemented through watershed management plans and NJPDES permits. Finally, the strategic watershed-monitoring program will address any special studies needed to address impaired waters for purposes such as problem quantification, TMDL development, and measuring program success. In certain cases, special studies may need to be performed in watersheds outside their designated monitoring period. Examples include nonpoint source (NPS) pollution control demonstration projects evaluating long-term NPS impacts or evaluating best management practice (BMP) effectiveness (such as for the Barnegat Bay Watershed Estuary, Musconetcong River, and Whippany River Watershed projects) or long-term TMDL development studies (such as the New York/New Jersey Harbor Estuary and the Delaware Estuary projects) that may take several years to complete.

The strategic watershed monitoring program will also explore and develop opportunities for coordinating and supplementing NJDEP monitoring resources through a variety of arrangements, including discharger monitoring consortiums, integration of compliance and ambient monitoring, and volunteer monitoring efforts. Examples of additional monitoring opportunities include biological screening conducted by qualified watershed associations and non-regulatory agencies, experimental monitoring where detection limits are too low for traditional monitoring applications. The South Branch Watershed Association has been conducting a volunteer monitoring program, based on NJDEP field training protocol and USEPA program guidance, for several years. The New Jersey Harbor Dischargers (draining to the New York/New Jersey Harbor), in cooperation with NJDEP, USEPA and New York agencies, have conducted sensitive experimental monitoring for polychlorinated biphenyls (PCBs) and other organic chemicals of concern in discharge systems and ambient waters of the Harbor as part of a non-regulatory “track down and clean up” effort that parallels the regulatory TMDL/WLA approach. This approach has been used extensively in New York State ambient waters (e.g. the Great Lakes Program) and recently in the New York City discharge system.

The DEP/USGS Ambient Ground Water Network is currently being redesigned in a manner similar to the surface water network. The revised ground water network will monitor water quality in a series of shallow wells and attempt to: (1) establish watershed specific relationships between landuse and water quality and (2) assess ground water impacts on surface water quality.